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DESCRIPTIONS OF NEW STAPHYLINIDAE (COLEOPTERA) [1]

By Malcolm Cameron, M.B., R.N., F.R.E.S.

Mitomorphus brevipennis sp. n.

Shining, head and thorax darker or lighter reddish-brown; elytra pitchy-black; the scutellum and base narrowly reddish-yellow; abdomen pitchy-black, the elevated lateral margins and posterior margins of the 7th and 8th tergites yellowish. Antennae reddish. Legs yellow. Length 6·5 mm.

In colour very like *indicus* Kr. but larger and more robust and the elytra without metallic reflex, the head more narrowed towards the front and so more ovate, the eyes much smaller. Head longer than broad (4 : 3·5), ovate, broader than the thorax, the eyes very small, in front with four very small quadrately placed punctures, behind the middle with transverse row of four moderate punctures, the sides and base with a few very small scattered punctures; ground sculpture absent. Antennae with the 3rd segment shorter than the 2nd, 4th to 10th transverse, the penultimate three times broader than long. Thorax longer than broad (5 : 3), the sides straight and a little retracted behind, with a row of six small punctures on each side of the middle, at the side with seven others in a hook-shaped line. Elytra a little shorter than the thorax (4 : 5), slightly widened behind, along the suture with five or six extremely fine and obsolete punctures, on the disc with five or six larger irregular punctures. Abdomen very finely and sparingly punctured and with a fine, transverse wavy ground sculpture.

Darjeeling: Ghum district: Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

Mitomorphus brachypterus sp. n.

Of the colour of *brevipennis* Cam. and only differs from it in the smaller size (5 mm.) and narrower build, the thorax with nine or ten moderate punctures in the dorsal row and with more numerous ones at the sides. The elytra are shorter than the thorax (2·5 : 3), the antennae less stout.

Darjeeling: Ghum district. Type in my collection.

Xantholinus (s.str.) **aeneus** sp. n.

Smaller (5–7 mm.) and narrower than *metallicus* Fauv. with stronger greenish-coppery reflex, the head much less widened behind, much less coarsely and a little less closely punctured, thorax narrower with dorsal row of ten large punctures and lateral curved row of about seven much as in that species, elytra as closely but not quite so coarsely punctured as in *metallicus* but in other respects similar.

Darjeeling: Ghum district. Type in my collection.

Othius kashmirica sp. n.

Shining, head and abdomen pitchy-black, thorax reddish, elytra pitchy-brown with the shoulders and posterior margin narrowly reddish-yellow. Antennae yellowish-red. Legs reddish-yellow. Length 6·5 mm.

Near *lapidicola* Kiesw. but differently coloured, the head broader, as long as broad, as broad as the thorax, the eyes smaller, elytra a little shorter, shorter than the thorax

[1] Continued from 1943, *Proc. R. ent. Soc. Lond.* (B) **12** : 36.

(3 : 3·75), the sculpture scarcely differing. Abdomen distinctly more closely punctured, the 7th tergite without membranous margin.

KASHMIR : Gulmarg. Type in my collection.

Othius monticola sp. n.

Shining, black, the elytra pitchy-black with the reflexed and posterior margins narrowly and obscurely yellowish. Antennae brown, the first three segments red. Legs reddish-yellow. Length 11–12 mm.

In size and build scarcely differing from *punctulatus* Goze, but differently coloured, the antenna a little longer, the 4th and 5th segments longer, the penultimate scarcely transverse, the post-ocular punctures larger, elytra about as closely but distinctly more coarsely punctured and without ground sculpture, the puncturation of the abdomen not so fine and not so close.

DARJEELING : Ghum district : Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

Actobius monticola sp. n.

Moderately shining, black. Antennae blackish, the first two and last two segments reddish-yellow, sometimes entirely reddish-yellow. Legs reddish-yellow, the intermediate and posterior tibiae blackish. Length 6 mm.

Larger and more robust than *cinerascens* Gr., the antennae longer, the penultimate segments distinctly longer, eyes larger, head less closely punctured, thorax more superficially punctured with much less distinct ground sculpture : from *affinis* Cam. differs in the larger size, longer antennae, much less closely, more superficially punctured head, less shining, more finely and superficially punctured thorax with distinct ground sculpture. Head as long as broad, quadrate, as broad as the thorax, the post-ocular region very slightly retracted to the rounded posterior angles, eyes rather large but a good deal shorter than the post-ocular region, finely moderately closely punctured, finely but distinctly coriaceous. Antennae with all the segments longer than broad, the penultimate only slightly. Thorax nearly a third longer than broad, narrowly impunctate along the middle, elsewhere with larger and closer punctures than on the head, the ground sculpture less distinct. Elytra longer (4·5 : 3·5) than the thorax, very finely and very closely punctured. Abdomen narrowed towards the apex, finely and closely punctured and pubescent throughout.

♂. 6th sternite with a shallow arcuate emargination, the area in front of it practically impunctate in the whole length of the segment.

DARJEELING : Ghum district : Mangpu. Type in my collection.

Actobius mangpuensis sp. n.

Shining, black. Antennae blackish, the last two segments reddish-yellow. Femora and tarsi reddish-yellow. Tibiae black. Length 4·5 mm.

Size and build of *basalis* Motsch. but entirely black, with darker antennae and legs; head, thorax and elytra with similar sculpture but the former slightly broader, the abdomen obviously less finely and less closely punctured and pubescent. The structure of the antennae similar.

DARJEELING : Ghum district : Mangpu. Unique. My collection.

Actobius major sp. n.

Moderately shining, black. Antennae blackish, the first two and the last two or three

segments reddish-yellow, sometimes the first two pitchy. Legs pitchy, the tarsi lighter. Length 7–8 mm.

Colour and lustre of *monticola* Cam. but larger and more robust, the legs darker, the antennae longer, the head differently shaped. Head very slightly longer than broad, short, oval, as broad as the thorax, as finely but distinctly less closely punctured than in *monticola*, finely but distinctly coriaceous as in that species. Antennae long and slender, all the segments longer than in *monticola*. Thorax longer than broad (4 : 3·5), impunctate along the middle, elsewhere as on the head, less close than in *monticola* and the ground sculpture weaker. Elytra longer than the thorax (4·5 : 4), very finely and very closely punctured. Abdomen narrowed towards the apex, very finely and closely punctured and pubescent throughout.

♂. 6th sternite with a shallow arcuate emargination in the middle of the posterior margin.

DARJEELING: Ghum district: Mangpu. Type in my collection.

Philonthus fletcheri sp. n.

Shining, black, the elytra with slight greenish metallic reflex; thorax with dorsal row of four punctures. Antennae black. Legs pitchy, the tarsi lighter. Length 6·5 mm.

Resembling *punctifrons* Cam. in the build, but with much shorter antennae, the head not punctured in front, the punctures of the dorsal row smaller, the elytra and abdomen less closely punctured. ♂. Head quadrate, distinctly broader than the thorax, slightly broader than long, in the ♀ narrower, as long as broad, as broad as the thorax, in both sexes with the inter-ocular punctures equidistant, the front with feeble median impression; eyes small, a good deal shorter than the temples, with a few small punctures between the eye and the neck on each side, the post-ocular region with three or four fine punctures; ground sculpture very fine. Antennae with the 3rd segment longer than the 2nd, 4th and 5th about as long as broad, 6th to 10th transverse, varying but little amongst themselves and about a half broader than long. Thorax longer than broad (4 : 3·5), the sides straight and distinctly retracted to the base; punctures of the dorsal row rather small; ground sculpture as on the head. Elytra as long as but broader than the thorax, the puncturation much like that of *sordidus* Gr. Abdomen finely and rather sparingly punctured, the ground sculpture fine; the 1st segment of posterior tarsi shorter than the last.

♂. Anterior tarsi simple. 6th sternite rather deeply arcuately excised, the margin of the excision with narrow shining border.

KASHMIR: Gulmarg. Type in my collection.

Philonthus montivagans sp. n.

Very near *fletcheri*, of the same colour, lustre and build, but larger, 7–7·5 mm.; the head in the ♀ as long as broad, broader than the thorax, the median inter-ocular punctures widely separated, much nearer to the external than to each other, the elytra more finely and more closely punctured, the abdomen a little more closely; antennae not quite so stout, the penultimate segments less transverse, in other respects similar.

♂ unknown.

DARJEELING: Ghum district. Type in my collection.

Philonthus mediocris sp. n.

Shining, black; thorax with dorsal row of four punctures. Antennae black. Legs reddish-yellow, the tibiae infuscate. Length 5–5·5 mm.

Near *kashmiricus* Cam. but smaller and narrower, the femora lighter, the elytra with-

out metallic reflex, less coarsely but more closely punctured, the abdomen more closely punctured. Head oblong, the posterior angles rounded, longer than broad (3 : 2·5), a little narrower than the thorax, the eyes small and flat, about a third as long as the post-ocular region, the median inter-ocular punctures widely separated, the front slightly impressed in the middle; between the eye and the neck with three or four small punctures and one or two smaller ones on the temporal region; ground sculpture very fine and wavy. Antennae as in *kashmiricus*, the penultimate segments distinctly transverse. Thorax longer than broad (3·5 : 3), the sides straight and very slightly retracted towards the front, with dorsal row of four moderate equidistant punctures, externally with three others, the ground sculpture as on the head. Elytra longer (4 : 3·5) than the thorax, the puncturation much as in *fimetarius* Gr., that of the abdomen also much as in that species. First segment of the posterior tarsi shorter than the last.

♂. Anterior tarsi simple. 6th sternite with small, smooth, triangular impression at the middle of the posterior margin, its base feebly arcuately emarginate.

KASHMIR: Gulmarg. Type in my collection.

Philonthus aeripennis sp. n.

Black, shining, the head and thorax with distinct metallic green reflex, the elytra brassy; thorax with dorsal row of four punctures; abdomen pitchy-black, the posterior margins of the tergites narrowly but distinctly yellowish-red. Antennae black, the first two segments yellowish-brown. Legs reddish-yellow, the tibiae infuscate. Length 5·5 mm.

Near *adversus* B. & S. but differs in the colour, much longer antennae and more closely punctured abdomen. ♂. Head very slightly longer than broad, quadrate, broader than the thorax, impressed in the middle in front, the median inter-ocular punctures widely separated from each other, much nearer the lateral, on each side of the disc with three or four punctures, and one or two others much smaller on the temples. ♀. Head narrower, longer than broad, as broad as the thorax. Antennae with the 4th and 5th segments a little longer than broad, 6th to 10th as long as broad and differing but little. Thorax longer than broad (3 : 2·5), the sides distinctly retracted towards the base, but less strongly than in *adversus*, with dorsal row of four rather large equidistant punctures. Elytra a third longer than the thorax, moderately finely, rather closely punctured. Abdomen very finely, rather closely punctured, more closely than in *adversus*. First segment of the posterior tarsi shorter than the last.

♂. Anterior tarsi simple. 6th sternite with feeble arcuate emargination at the middle of the posterior border filled in by membrane.

DARJEELING: Ghum district: Tiger Hill, altitude 8500–10,000 feet. Type in my collection.

Philonthus funeralis sp. n.

Black, shining, abdomen somewhat iridescent. Thorax with dorsal row of five punctures. Antennae, palpi and legs (including the coxae) black. Length 13·5 mm.

Build of *foetidus* Cam. but larger, the antennae similarly constructed but stouter, puncturation of elytra as close but coarser, abdomen less finely, distinctly less closely punctured and more iridescent. Anterior tarsi dilated in both sexes, more strongly in the male. First segment of posterior tarsi longer than the last.

♂. 6th sternite with smooth acute triangular impression at the middle of the posterior margin, the posterior part of the impressed area membranous and white.

KASHMIR: Gulmarg, altitude 8000–10,000 feet. Type in my collection.

Philonthus atricoxis sp. n.

Shining, deep black. Antennae, palpi and legs (including the coxae) black. Thorax with dorsal row of five punctures. Length 6·5–7·5 mm.

In size and build scarcely differing from *varians* Payk. but the antennae shorter and stouter, the penultimate segments about as long as broad, the coxae deep black, the elytra and abdomen not quite so closely punctured, the former blacker than in the black form of that species. From *nigricoxis* Cam. it differs only in the rather less closely, less finely and less roughly punctured elytra.

♂. Anterior tarsi dilated. 6th sternite acutely triangularly impressed, the base of the impression rather deeply arcuately emarginate.

KASHMIR: Gulmarg, altitude 8000–10,000 feet. Type in my collection.

Philonthus (Gabrius) sodalis sp. n.

Shining, black, the elytra pitchy-black: thorax with dorsal row of five punctures. Antennae and palpi black. Legs brownish-yellow, the tibiae pitchy. Length 4·5 mm.

Near *foveifrons* Cam. but with narrower, oval head, the ground sculpture much weaker, the eyes larger, the antennae entirely black and with more transverse penultimate segments, elytra a little longer, pitchy-black, the punctures finer and closer, abdomen more narrowed towards apex. Head short, oval, slightly narrower than the thorax, in the middle between the eyes with a small round fovea, median inter-ocular punctures widely separated, ground sculpture scarcely visible. Antennae with the 3rd segment as long as the 2nd, 4th slightly longer than broad, 5th as long as broad, 6th to 10th transverse, the penultimate about a half broader than long. Thorax a little longer than broad, the sides parallel, ground sculpture absent. Elytra scarcely longer than the thorax, moderately finely and moderately closely punctured. Abdomen finely and moderately closely punctured.

UNITED PROVINCES: Chakrata district: Sainj Khud, altitude 6500 feet. Unique. My collection.

Philonthus (Gabrius) rupicola sp. n.

Black, shining, the elytra dark blue, less shining: thorax with dorsal row of six punctures. Antennae and legs black, the tarsi reddish-yellow more or less spotted with black. Length 6 mm.

Near *humidulus* Cam., and like it has the abdomen adjacent to the side margin more thickly pubescent than elsewhere, but the head is a little shorter and broader, the elytra blue and much more finely and closely punctured as is the abdomen also. Head subovate, longer than broad (3 : 2·5), as broad as the thorax, the eyes small, the front sometimes with a small impression, the median inter-ocular punctures widely separated, the ground sculpture fine and wavy. Antennae with the 4th and 5th segments slightly longer than broad, 6th and 7th about as long as broad, 8th to 10th very slightly transverse. Thorax longer than broad (3·3 : 2·5), the sides straight and retracted towards the base, with dorsal row of six moderate punctures and three others externally: ground sculpture as on the head. Elytra as long as but broader than the thorax, very finely and closely punctured. Abdomen very finely and closely punctured and pubescent, the pubescence closer and more evident at the sides. First segment of posterior tarsi scarcely shorter than the last.

♂. Anterior tarsi simple. 6th sternite with a narrow, smooth digital impression at the middle of the posterior margin.

This species together with *humidulus* belong to the *astutus* Er. group.

DARJEELING: Ghum district. In stream, in moss on boulders.

Philonthus (Gabrius) ignobilis sp. n.

Black, shining; thorax with dorsal row of six moderate punctures. Antennae black, the 1st segment and base of the 2nd reddish. Legs reddish-yellow, the tibiae infuscate. Length 5·5 mm.

Very near *vicinus* Cam. but with the elytra shorter, blacker and not quite so finely punctured; head a little shorter. Antennae longer, the penultimate segments scarcely transverse. Head quadrate, as long as broad, as broad as the thorax, the eyes small, about $\frac{1}{3}$rd the length of the temple, median inter-ocular punctures widely separated, the front with slight impression; behind the median inter-ocular punctures with another pair and a row of six others extending from the inner border of the eye towards the neck, the post-ocular region with a few smaller ones. Antennae slender, the 4th to 6th segments slightly longer than broad, decreasing in length, 7th about as long as broad, 8th to 10th scarcely transverse. Thorax longer than broad (3 : 2·5), the sides straight and very slightly retracted towards the front, with dorsal row of six moderate punctures and two others externally. Elytra as long as but broader than the thorax, finely, moderately closely punctured. Abdomen very finely, rather closely punctured throughout; ground sculpture scarcely visible. Head and thorax with very fine wavy ground sculpture. Anterior tarsi simple. First segment of posterior tarsi shorter than the last.

♂. 6th sternite with smooth acute triangular impression at the middle of the posterior margin.

KASHMIR: Gulmarg, altitude 8000–10,000 feet. Type in my collection.

Philonthus (Gabrius) deceptivus sp. n.

Size, build and colour of *parkeri* Cam., but differs in the much more finely and more sparingly punctured elytra and the less closely punctured abdomen with shorter pubescence. Length 5·5 mm.

♂. Anterior tarsi simple. 6th sternite along the middle with a narrow parallel impunctate impression, its posterior margin very feebly arcuately emarginate.

KASHMIR: Gulmarg. Type in my collection.

BOOK NOTICE.

The Golden Throng. A book about bees. By E. W. TEALE. 8vo. London (R. Hale, Ltd.) 1942. pp. 160, 65 pls. Price 21*s.* 0*d.*

In his Foreword the author writes: "The story of the bees has been told by poets like Maeterlinck, by scientists like Huber and Lubbock, by practical beekeepers like Phillips and Root. . . . In adding this volume to the long list of bee books, I have sought—in addition to recording discoveries of recent years—to bring to the reader, through the eye of the camera, the age-old drama of life in the hive and in the bee's world of flower-filled fields."

The text is written in plain language which can be understood by any average person, but the chief feature of the book is the illustrations. These are very beautiful and well reproduced, for, while some indication of wartime paper is to be noticed in the text, there is no sign in the paper used for the plates.

A chapter entitled "Photographic Postscript" gives some practical hints to the would-be photographer of bees.

There is a "Bibliography" at the end of the volume which undoubtedly suffers from the author's omission to provide the dates of the works he lists.

ON THE GENERA AND NOMENCLATURE OF THE LUCANID COLEOPTERA, AND DESCRIPTIONS OF A FEW NEW SPECIES

By Gilbert J. Arrow, F.Z.S., F.R.E.S.

British Museum (Natural History).

Eight years ago, in "A Contribution to the Classification of the family Lucanidae" (1935, *Trans. R. ent. Soc. Lond.* **83** : 105), I put forward the principle that, except in certain peculiar circumstances, genera should not be based upon characters confined to one sex and proposed, as a consequence, the abandonment of various generic names in use in the Lucanidae. The principle received general assent when submitted to a meeting of the Royal Entomological Society and during the years that have since elapsed it has not, so far as I am aware, been adversely criticised anywhere. The desirability of the simplified nomenclature resulting from its acceptance may therefore be regarded as admitted.

In the family Lucanidae the extreme polymorphism of the males has been the cause of a great multiplication of names, but this family is not one of the very large groups of beetles and a considerable reduction in the number of genera will leave the largest genus far inferior to many genera of other families. In the last catalogue of Lucanidae, published in 1910, 750 species were enumerated and the number has since been raised to over a thousand but this certainly includes many yet undiscovered synonyms. As further collecting continues to reveal the extent of polymorphism, the addition of new names to the list is likely for long to be accompanied by the removal of others. Since the most obvious distinctive features are found in the mandibles of the males, the variation of which is only exhibited by long series which, as I have recently shown, sometimes include isolated phases connected by no intermediates with the rest, far more collecting is required before any adequate revision of the catalogue will become possible.

If the form of the mandible of the male provides an unreliable basis for distinguishing species it is still more so for the establishment of genera, which, to be natural, must be based on fixed and well-established characters. A number of names treated as generic in the catalogues were intended by their authors only as subgeneric and by those who consider as useful subgenera of which the only distinctive features are not always present, they can still be so employed; but subgeneric names are open to the serious objections mentioned in my paper quoted above (see also 1935, *Proc. R. ent. Soc. Lond.* **83** : 34) and in the interest of clarity are better avoided. The invariable confusion which arises from the use of names indistinguishable from those of genera are avoidable by adherence to the Linnaean method of using terms with plural endings for all subdivisions except the genus; or sections of the genus may be designated by a letter or number, or by the name of a representative species.

Lamprima.

Dr. Didier (1931) has maintained as a distinct species, *Lamprima coerulea*, a blue form supposed to be that to which the name *coerulea* was given by Donovan in 1805 and regarded by Boileau (1913) as a "variety or subvariety" of *L. latreillei* Macl. Nagel (1933) has pronounced this to be closer to *L. aurata* Latr. than to *L. latreillei* on account of the blunter mesosternal process, which

seems to be the only means of distinguishing them. Unless Donovan's original specimen can be discovered it will probably remain impossible to determine to which of these forms it belongs. It is a little doubtful whether they are always distinguishable. Similar blue forms seem to occur in *L. aurata* Latr., *latreillei* Macl. and *adolphinae* Gestro, linked by every shade of green and golden-green to the red and purple phases. While the head is more constant in colour, it also varies but is generally red.

Lucanus.

As I pointed out in 1935, the separation of *Lucanus* and *Pseudolucanus* by the form of the mandibles in the male is untenable. Their union entails the re-naming of *L. oberthuri* Planet (Tibet), since the name was employed a year earlier for *L.* (*Pseudolucanus*) *oberthuri* Planet (Sikkim). The Tibetan species may be called **Lucanus laetus** nom. n.

Lucanus laevigatus Didier (1931), according to a co-type in the British Museum, is the glossy black female of the dull red *L. fortunei* Saund. Both sexes were taken together but, when received by the Museum, were not at first associated, owing to their remarkable dissimilarity.

Calcodes.

I have shown that *Calcodes*, *Odontolabis* and *Neolucanus* cannot properly be separated, the last consisting only of species in which the mandibles of the male have not advanced beyond the stage of development found in small specimens of the former. A few specific names which have been twice used must be changed.

Calcodes (*Odontolabis*) *leuthneri* was described by Boileau in 1897 and *C.* (*Neolucanus*) *leuthneri* in 1899 but the later name is a synonym of *C. parryi* Leuthner, described in 1885. The last name was used again by Boileau in 1905 for *C.* (*Odontolabis*) *parryi*, which, according to Kriesche (1922), does not differ specifically from *C. siva* Hope & Westwood. From its habitat, as well as the various slight structural differences, it seems to me more likely to prove distinct. The British Museum contains a female from Formosa and a small male from the adjacent mainland of Foochow. The male differs from that of *C. siva* in having the canthus distinctly angulate in front of the eye and the prosternum not pointed but forming a rounded boss behind the front coxae. The female has the prosternum pointed behind but not produced as it is in *C. siva*. For Boileau's name I propose to substitute **Calcodes chinensis** nom. n.

Calcodes (*Odontolabis*) *celebensis* was named by Leuthner in 1885 and *C.* (*Neolucanus*) *celebensis* by Möllenkamp in 1900. For the latter name may be substituted **Calcodes celebicus** nom. n.

Another duplication of names has occurred with *C.* (*Odontolabis*) *intermedius* Van de Poll and *C.* (*Neolucanus*) *intermedius* Houlb. (1914) but the latter is undoubtedly a variety of *C. opacus* Boil. and no serious difficulty arises.

The unique specimen named *Neolucanus sarrauti* by Houlbert (1912) and considered by him to be a female is shown by the shape of the head and mandibles and the slenderness of the legs in his figures to be a male. It may be a dwarf specimen of *C. championi* Parry or *C. opacus* Boil. I am not entirely satisfied that these are really distinct.

I have been able to examine types of both *C.* (*Neolucanus*) *latus* Boil. (1902) from Burma and *apricans* Möll. (1912) from Assam and have found

them to belong to the same species. Boileau's name, as the earlier one, must be adopted.

I believe Kriesche's pronouncement (1922), that *C. fallaciosus* Boil. (or *fruhstorferi* Meyer-Darcis, the two names seem to have been published almost simultaneously in November 1901), *C. salvazae* Pouill. and *C. sinensis* Westw. are colour-phases of the well-known *C. cuvera* Hope, will prove to be correct.

The abundant Indian *C. castanopterus* Hope shows a marked tendency to develop imperfectly defined local races. *Neolucanus melas* Did. (1930) is a dark race of it, while *N. elongatulus* Möll. (1905), *pallidus* Boil. (1914) and *flavipennis* Boil. (1914) must be considered pale races. The var. *flavipennis*, in the type as well as in two specimens (from the Ruby Mines, Burma) in the British Museum has the peculiarity of a 4-jointed, instead of 3-jointed, club to the antenna but, since two other specimens taken at the same time are practically normal, this cannot be considered of much weight.

For the nearly related *C. vicinus*, Pouillaude (1913) has given the total length as 21 mm., probably a misprint, as his figure, said to be of the actual size, measures 38 mm. A series of examples in the British Museum, which I believe to represent this species, measure from 29 mm. to 33 mm.

Other synonyms in this genus are the following :—

C. marginatus Wat. = (*Neolucanus dohertyi* Houlb. (1914)). I have compared the types.

C. baladeva Hope = (*Neolucanus ollenbachi* Did. (1930)). Dr. Didier has incorrectly stated that this is related to the parti-coloured *C. marginatus* Wat., a very different species. He intended to refer to the uniformly dark insect suggested by Waterhouse, but without good reason, as possibly the male of *marginatus*, of which he knew only the female.

Leptinopterus.

Boileau has recorded (1913, *Trans. ent. Soc. Lond.* **1913** : 236) that the type of *Leptinopterus polyodontus* Hope & Westw. is a specimen of *L. ibex* Billb. The species described under the name *polyodontus* by Burmeister is quite a different one and, as I am not aware that it has received any other name, it may be called **Leptinopterus burmeisteri** nom. n.

Dorcus.

In describing *Metopodontus lunulatus*, from Central Africa, in 1911, and *M. flavomaculatus*, from the Congo, in 1912, Möllenkamp referred to the similarity of their pattern of yellow and black to that of an Erotylid beetle, *Encaustes*. Five years later, in 1917, I described, as *Encaustes africana*, the first species of that genus recorded as African. This was found at Kasongo, on the Upper Congo, and its markings so much resemble those of the quite peculiarly decorated Lucanids that, both being timber-haunting insects and the Erotylid probably nauseous, the Lucanids can be reasonably regarded as mimics of the other. It seems most likely that both Möllenkamp's names are synonyms of *Homoderus variegatus* Boil., as suggested by Kriesche (1926), who has referred the insects to a new subgenus (*Homoderinus*) of *Prosopocoelus*. It is significant of the vagueness of the accepted genera that each of these three authors has used a different generic name. I regard all as synonyms of *Dorcus*.

In a note by Westwood appended by Parry to his description of *Ditomoderus* it is clearly stated that this was intended as a subgenus and there

is no good ground for separating it from *Dorcus*. The antennae have a 4-jointed club, but there are various species of *Dorcus* of which the club can be equally well described as 4-jointed.

Rhaetus Parry, *Rhaetulus* Westwood and *Pseudorhaetus* Planet were all devised for species of this genus of which large males show a fantastic development of the mandibles, while the females can only be regarded as congeneric. *Rhaetulus* was intended as a subgenus only by Westwood, who seems to have consistently maintained the insufficiency of sexual characters for establishing genera. *Rhaetulus speciosus* Boileau (1911), bearing a name preoccupied by his *Metopodontus speciosus* (1904), may be called *boileaui* Didier, the name bestowed in 1925 upon one of its various colour-phases. It is evident from the description that *Rhaetulus sauteri* Möll. (1912) is a small male of *R. crenatus* Westw.

Tetrarthrius Did. (1926) and *Capreolucanus* Did. (1928) also owe their existence to the curiously shaped mandibles of well-developed male specimens and *Falcicornis* Planet rests on no firmer foundation. *T. castaneus* Did., bearing a name used long previously, may be called **Dorcus rufobrunneus** nom. n.

Gonometopus and *Pelecognathus* of Houlbert (1915) are based on similar features, not to be found in females and in all probability absent in small males, and the former seems to differ in no important respect from *Cyclorasis*, proposed by Thomson for *platycephalus* Hope, but since regarded as superfluous.

Eligmodontus Houlb. (1915) was formed for a male specimen with the inner edges of its mandibles serrated, apparently a rather poorly developed example of a species related to *Dorcus foveatus* Hope. The diagnosis of *Durelius* Houlb. (1915), although drawn from both sexes, includes no single distinctive feature except the shortness of the male mandibles. In formulating this genus Houlbert was unduly influenced by the remark of Parry (which he reprints) in describing the female, that " the slender antennae and unarmed posterior (*i.e.* hind) tibiae are so utterly anomalous as to leave some doubt whether it be really a female." If Parry had seen the now well-known *Dorcus rubrofemoratus* Voll. he would not have failed to recognise the very close relationship of the two species pointed out by Boileau. Another nearly related species may be described here.

Dorcus wardi sp. n.

Black and shining, with the mandibles, head and pronotum of the male duller but smooth, the head of the female rather roughly and irregularly punctured and the outer half of the elytra very densely punctured and opaque. The body is rather narrowly elongate, parallel-sided and convex, the sides of the elytra almost straight and the shoulders not sharply angular. The ocular canthus reaches the middle of the eye. The middle tibia bears a strong lateral spine and the hind tibia a feebler one.

♂. The head is short, almost as wide as the pronotum, the lateral angles sharp but not produced and the sides contracted behind the eyes. The entire upper surface is unpunctured and very smooth. The pronotum is short and broad, the lateral angle rather sharp. The mandibles are far apart at the base, flat, gently curved externally, with a short, broad, 2-pointed interior branch situated nearer the tip than the base.

♀. The head bears a pair of rather close and prominent, transversely placed tubercles, is a little hollowed and rather finely and closely punctured in front of these, and less finely and not closely punctured behind them. The posterior part is smooth and shining and the sides are closely rugose. The pronotum is very smooth and shining except at the lateral margins, where it is rugosely punctured. The front angles are bluntly produced,

the sides gently curved to the lateral angle and from there abruptly contracted to the base.

♂. Length (with mand.) 39 mm.; (without mand.) 30 mm.; breadth 13 mm. ♀. Length 28–30 mm.; breadth 11·5–12·5 mm.

S.E. Tibet: Zayul, Di Chu Valley, 11,000 ft., August (*F. Kingdon Ward* and *R. J. Kaulback*). Upper Burma: Seinghku Valley, 9500 ft., July (*F. Kingdon Ward*).

It is most closely related to *D. sinensis* Boil. and *semenowi* Jak., but the lateral angulation of the pronotum is sharper in both sexes, the anteocular angle of the male is sharp, the front angle of the pronotum blunt and not produced and the sides evenly curved to the lateral angle. In the female the sides of the pronotum are more rugose than in the related species. The mandibles of the male are relatively broader and the narrow internal branch found in those species is here replaced by a broad dilatation at the same point.

The Australian insect described by Westwood as *Dorcus carbonarius* in 1863 and afterwards identified as *hydrophiloides* Hope & Westw., was in 1870 given a generic name *Pseudodorcus* by Parry, who distinguished it from *Dorcus* only by its small head and mandibles, broader form and rounded thorax. Boileau, who redescribed at length the typical specimens in London and Oxford (1913), also discussed its peculiarities in a note printed by Dr. Didier (1926) and pointed out its resemblances to *Dorcus torresensis* Deyr. He found its chief distinctive feature in the strongly tridentate four posterior tibiae. But these differ only in a slight degree from those of other species of *Dorcus*, e.g. *D. opacipennis* and *ratiocinativus*. It is especially characteristic of the female and I regard *hydrophiloides* as a *Dorcus* in which the sexual dimorphism is probably reduced to its lowest level in this genus. Dr. Didier has named a related species *Pseudodorcus nitidus*. On account of the earlier *Dorcus nitidus* Kirsch, this name may be changed to **Dorcus laevis** nom. n.

As to the genus *Dorculus* Did. (1930) although the description mentions no distinctive character it is not possible to form an opinion upon it until further particulars are available. The two species placed in it have probably little relationship.

I have referred previously (1937, *Trans. R. ent. Soc. Lond.* **85**: 244) to the impossibility of separating specifically *Dorcus titanus* Boisd. and *platymelus* Saund. Nagel (1924) has described and figured a specimen to which he has given a varietal name *typhoniformis*, referring it to the species *platymelus* and comparing it with *D. titanus* var. *typhon* Boil. Probably its Chinese habitat alone led him to assign it to *platymelus*, for it may be noted that it does not greatly differ from the type of *titanus*, as figured by Boisduval. That specimen was an inhabitant of Celebes. A rather similar specimen in the British Museum is from the Philippine Is. and another from South China with mandibles of similar form, developed in a still more pronounced degree, has been figured and described by Didier under the name *Eurytrachelus prometheus* (1925, *Bull. Soc. ent. France* **1925**: 251). The names of these various forms being applicable to large males only are hardly entitled to be considered varietal.

Eurytrachelus tethys Did. (1929) is a form of the male *D. tityus* Hope and a smaller form of the same species is *affinis* Pouill. (1913), but the female associated by Pouillaude with the latter is probably that of another species.

Cladognathus bouvieri Did. (1936) is a small male of *Dorcus giraffa* F.

The name *formosanus* has been given to three Formosan species of *Dorcus*, the first being *Prismognathus formosanus* Nagel (1928). Another is *Leptino-*

pterus formosanus Miwa (1929), unaccountably attributed to a South American genus although nearly related to the common *D. rectus* Motsch. This may be called **Dorcus formosae** nom. n.

The third species, *Dorcus formosanus* Miwa (1929), described and figured from a single male specimen, is evidently the great Indian *D. antaeus* Hope, the occurrence of which so far east of its known habitat is surprising and not impossibly due to some accident.

Prosopocoelus crassus Did. (1931), from " San Thomé, Java ", is the very common African *Dorcus antilope* Swed. A co-type in the British Museum, bearing Didier's name in his own handwriting, was taken in the West African island of San Thomé " on the road to Java ". *Prosopocoelus hanningtoni* Wat. is the nearly related *D. natalensis* Parry and *Prosopocoelus curvidens* Nonfr., is evidently a male of *D. serricornis* Latr. with highly developed mandibles.

The wide-ranging *Dorcus bison* Oliv. is found in Northern Australia and I have no doubt that *Metopodontus magnificus* Möll. (1906) belongs to that species.

Boileau gave the name *Prosopocoelus parryi* to the second *Lucanus bulbosus* of Hope but, on account of the earlier *Dorcus parryi* Thoms., I propose to change this to **Dorcus polymorphus** nom. n.

The name of *Gnaphaloryx davidis* Fairm., the near relationship of which to the well-known *D. parallelipipedus* L. was so strangely overlooked by Fairmaire, must also be changed on account of the earlier *Prismognathus davidis* Deyr. It may be called **Dorcus davidianus** nom. n.

It seems likely that comparison of a sufficient number of specimens will show that *Eurytrachelus castelnaui* Deyr., *hansteini* Albers, *prosti* Boil. and *mandibularis* Möll. are inseparable. Probably all are forms of *D. reichei* Hope.

A few other new synonyms are the following :—

D. sewertzowi Sem. = (*Dorcus rugatus* Did. (1927)).
D. submolaris Hope = (*Eurytrachelus fuliginosus* Did. (1928)). I have examined both the types.
D. dentifer Deyr. = (*Prosopocoelus parallelus* Did. (1931)). Type of *parallelus* in the British Museum.
D. buddha Hope = (*Prosopocoelus cardoni* Did. (1927)). Co-type of *cardoni* in the British Museum.
D. subnitens Parry = (*Prismognathus parvus* Did. (1928)). Co-type of *parvus* in the British Museum.
D. bisignatus Parry = (*Hemisodorcus rufonotatus* Pouill. (1913)).
D. crenulidens Fairm. = (*Prosopocoelus denticulatus* Boil. (1901)).

Apterocyclus.

The seven species attributed to this Hawaian genus by Sharp in 1908 were reduced to one by Dr. Van Dyke in 1922. Since he has studied over a hundred specimens without discovering grounds for specific differentiation, his conclusion that all these belong to a single variable species cannot be contested. The type of *A. waterhousei* Sharp, however, differs so greatly from the other six types in the British Museum that I am unable to adopt his view that this species is not separable from *A. honoluluensis* Wat. The very much shorter and stouter legs, the straight sides of the pronotum and its abrupt hind angles, the flattened sides of the elytra and sharply angular apices separate it widely from all the other specimens known to me. The

stout legs suggest the female sex but the specimen is a male and the sexes of *Apterocyclus* do not differ in this way. It seems likely that, as in other wingless genera (e.g. *Colophon*), it may be found that there are several geographically isolated species of very narrow range in the genus.

Scortizus.

The genus *Scortizus* was formed by Westwood in 1834 for the South American *Lucanus maculatus* Klug and in 1845 *Sclerognathus* was devised for *costatus* Hope & Westwood. That name, being already in use, was replaced by *Sclerostomus* in 1847 by Burmeister, who added five other species. The type-species *costatus* was transferred to *Scortizus* in Van Roon's catalogue and, if this is justified, *Sclerognathus* and *Sclerostomus* being, according to Burmeister, names for the same genus, become synonyms of *Scortizus*. The type-species *maculatus* and *costatus* have little resemblance but there is a rather important feature, apparently overlooked, which is in favour of Van Roon's view. The three club-joints of the antenna, in these and other species, instead of being clothed with fine hair in the usual way, are extremely smooth and shining, with the sensory surface confined to the terminal part and sharply circumscribed by a definite line. These joints are very short, closely articulated and probably scarcely separable. The antennae of the Oriental genus *Figulus* have the same character. Four of Burmeister's six species of *Sclerostomus*, viz. *costatus* H. & W., *cruentus* Burm., *plagiatus* Burm. and *cucullatus* Bl., belong to *Scortizus*, as thus defined, as well as *maculatus* Kl., *buckleyi* Wat., *gounellei* Boil., *tuberculatus* Sol., *ruficollis* Lued. and *zikani* Ohaus. Many of these show a tendency to the production of the pronotum in front, culminating in a well-defined horn in *cucullatus* Bl. The last and other related species inhabiting Chili were in 1851 referred to the genus *Dorcus* by Solier, who proposed for them two subgeneric names, *Epipedus* and *Pycnosiphorus*. *Epipedus* had been used twice previously but *Pycnosiphorus*, of which the type is *mandibularis* Sol., may be adopted for that and the numerous other species, at present catalogued as *Sclerognathus*, which cannot be referred to *Scortizus*. A very broad depression in the middle of the pronotum is characteristic of many of the species of *Pycnosiphorus*.

The *Lucanus bacchus* Hope & Westwood, called *Sclerostomus darwini* by Burmeister and *Dorcus darwini* by Solier, is a rather isolated insect, with a very smooth rounded pronotum. It is destitute of wings and has the elytra completely fused together and of a peculiarly short rounded form. The four posterior tibiae have each a very strong lateral spine and a small supplementary spine preceding it. These features are sufficient to distinguish it from *Dorcus*, to which, like *Apterocyclus*, it is related. For this species (*Lucanus bacchus* Hope & Westwood) I propose the new genus **Apterodorcus** gen. n.

Figulus and *Cardanus.*

Cardanus linearis Did. (1929), of which Dr. Didier has kindly sent me the type for examination, is a species of *Figulus*.

The widespread *Figulus fissicollis* Fairm., like other widely distributed species, is rather variable and has received many names. One of these is *lilliputanus* Westw. and another is *monochromus* Did. (1930), of which the British Museum contains specimens taken together with the type by Muir.

Figulus humeralis Did. and *nubilus* Did. (1930), from the small island of Larat, are probably identical.

Three species of *Cardanus* from Sumatra are at present known, *C. sulci-*

thorax Perty (*sulcatus* Westw.), *costatus* Rits. and *sericeus* Boil. A fourth appears to be undescribed.

Cardanus reticulatus sp. n.

Very dark pitchy black, with a very inconspicuous clothing of minute pale setae, most apparent upon the legs, the lower surface and the posterior part of the elytra. It is a smaller and rather less elongate and cylindrical species than *C. sulcithorax*. The head is slightly hollowed above, strongly punctured, with the lateral margins rounded and not angulate. The mandibles are less curved than those of *C. sulcithorax* and only feebly toothed. The pronotum is as long as it is wide, very strongly and densely punctured, with a shining median tubercle a little behind the front margin and a feeble groove extending from this to the base. The elytra also are densely punctured, but the punctures are partly coalescent and show only traces of linear arrangement, the extremely narrow interstices forming a fine network. Upon the anterior half of each elytron there is an imperfect costa at a little distance from the suture. The entire lower surface is strongly but less densely punctured.

Length 11 mm.; max. breadth 3 mm.

Sumatra: Korinchi, Sungei Kombang, 4500 ft. (*C. Boden Kloss*, April).

Cardanus sulcithorax and *costatus* are found in Borneo as well as Sumatra. *C. sericeus* is described by Boileau as bearing upon the elytra extremely regular punctured striae. The short golden hairs with which the elytra are clothed are represented in *C. reticulatus* by very minute and inconspicuous setae and the punctured striae are replaced by an irregular network formed by the narrow interstices of the partly coalescing punctures. In *C. sulcithorax* there is a deep pit in each front angle of the pronotum, but there is no trace of this in *C. reticulatus* nor apparently in the other species of the genus.

Aegus, *Aegotypus*, *Lissotes*.

A genus *Xenostomus*, distinguished from *Aegus* by the obliteration of the suture dividing the mentum and submentum, was proposed by Boileau; but this suture is quite normal in the female and distinctly visible in small males. It is therefore useless as a generic character and nothing remains by which a separate genus can be recognised.

Another genus *Paraegus*, also distinguished only by a feature of the large male, the form of the mandible, was proposed in 1888 by Gahan, who considered it intermediate between *Aegus* and *Lissotes*. The female has all the characteristics of *Aegus*, as have small males, and the genus cannot be retained. Like *Aegus*, it has perfect wings, whereas all the species of *Lissotes* appear to be flightless and to have the elytra immovably united. They also have the eyes undivided, while those of *Aegus* are completely divided, and the sculpture of the upper surface is not the same.

In 1939 I figured and distinguished three species of Lucanidae from the Caroline Is. One of these, *Aegus alternatus* Fairm., was described by Boileau in 1910 as *Metallactulus bennigseni*, which is therefore a synonym. Although his figure is incorrect in the two important features—the completely divided eyes and the paired striae of the elytra—the quite characteristic shape of the insect renders its identification sufficiently certain. It appears to be a rather abundant insect in Ponape Island. *Metallactulus* has the eyes undivided and, as I have already recorded, is synonymous with *Dorcus*.

A related species of *Aegus*, also with geminate-striate elytra, is *A. woodfordi* Wat. A later name for this is *Aegus barbatus* Nagel (1928). Waterhouse's

type is a male of small size, which, as in other species, shows an approach in the puncturation of its upper surface to that of the female.

Aegus subnitidus Wat. is a synonym of *A. laevicollis* Saund. The types of both are in the British Museum.

The habitat attributed to *Aegus chelifer* Macl. by its author was not Australia, as stated by Parry and Boileau, but the vague " Australasia ", indicating that its actual origin was uncertain. It seems very doubtful whether *Aegus specularis* Jak. can be distinguished from this species notwithstanding its flatter elytral intervals.

Since I have found it necessary to refer *Gnaphaloryx dilaticollis* Parry to the genus *Aegus* (in which, unlike *Gnaphaloryx*, the eyes are completely divided) the later-dated *Aegus dilaticollis* Rits. (1900) must be re-named and I propose to call it **Aegus laticollis** nom. n.

The authors of the name *Aegus javanicus* Oberth. & Houlb. (1914) evidently suspected the identity of the species with *Aegus pengalenganus* Van de Poll, taken in the same locality. The British Museum contains co-types of this, which leave no doubt about the matter.

Aegus delicatus sp. n.

Dull brownish-black, the sides and apices of the elytra, as well as the legs, clothed with short grey setae.

♂. The head and pronotum are closely and rugosely punctured, the head rather convex, its front margin bearing two slight rounded prominences close together in the middle and the lateral margins produced outwards behind the eyes. The mandibles are a little longer than the head and evenly curved, each bearing a long blunt basal tooth, the two teeth meeting in the middle line, and dilating to form another blunt and not very prominent tooth between the basal one and the tip. The upper surface of the pronotum is uneven, its sides are very rugose, the lateral margins nearly straight and parallel and the angles very blunt. The elytra are deeply striate, except at the sides, which are densely rugose, the intervals are closely punctured, except towards their extremities, the 3rd and 5th united behind, the outer margins are rounded, a little contracted at the base and the apices are produced.

Length (with mandibles) 13 mm.; (without mandibles) 11 mm. Max. breadth 4·5 mm.

Malay Peninsula : Perak (*W. Doherty*).

Two male specimens.

Although the very closely sculptured upper surface, no doubt to be found also in the female, may suggest the possibility that the specimens described represent a low development of the species, the form of the mandibles seems to render it more probable that no very much higher development is attained. There is some affinity with the Javan *A. preangerensis* V. de Poll in the sculpture and the form of the mandibles, but the latter have in *A. delicatus* an additional tooth, the sculpture is denser and the elytra are shorter, more ovate and more produced behind.

The species next described was determined by Boileau, with a note of interrogation, as *Aegus oxygonus* Jakowl., but that appears to me, from the description, to be a quite different insect, closely similar to, if not identical with, the later described *Aegus gracilicornis* Möll. It is clearly distinguished from the new form by the very slender, widely separated mandibles, with acute basal tooth, and the process behind the eye, said to be rounded, has evidently not the narrow shape found here. Although considerably larger and without trilobate margins to the thorax, the peculiar form of the head,

thorax and elytra of this insect reveals indisputably a close relationship to the type-species of *Aegotypus*.

Aegotypus auritus sp. n.

Dark chocolate-brown, the upper surface dull and coarsely and shallowly punctured, except upon the dorsal part of the elytra, the punctures filled with yellowish matter and each bearing a very minute short seta. The legs and the extremities of the elytra are clothed with short stiff grey hairs.

♂. The head is broad and flat, strongly and rather closely punctured, the front margin gently excised in the middle, with a small rounded prominence on each side of the excision, the sides provided with bluntly angular lobes, directed obliquely forward, behind the eyes. The mandibles are rather longer than the head, moderately broad and rather feebly curved, the upper edge having a strong truncate internal branch at the base and a slight blunt tooth about the middle, the lower edge a well-marked but gradual dilatation just before the tip. The pronotum is short, broad and strongly punctured. The front angles are obliquely produced, forming strong blunt lobes, the lateral margins are strongly but not sharply angulate near the middle and then strongly contracted to the base, which is narrow. The elytra are rounded at the sides and have each 6 or 7 deep striae upon the dorsal part, the sutural interval fairly closely and the remaining intervals very finely and scantily punctured, the outer margins broad, flat, strongly punctured and setose and the shoulders sharply angular. The legs are rather slender, the front tibia with three fine teeth before the terminal fork, the middle tibia with two lateral spines. The metasternum is coarsely punctured and the abdomen is clothed beneath with yellow setae.

The female is unknown to me.

Length (with mandibles) 17–22 mm.; (without mandibles) 14–17 mm. Max. breadth 7–8 mm.

North Borneo: Mt. Kina Balu.
There are three male examples in the British Museum.

Generic names newly treated as synonyms in this paper.

Dorcus Macl., 1819.
syn. *Ditomoderus* Parry, 1864.
Rhaetus Parry, 1864.
Rhaetulus Westwood (subgenus), 1871.
Pseudorhaetus Planet, 1899.
Tetrarthrius Didier, 1926.
Capreolucanus Didier, 1928.
Gonometopus Houlbert, 1915.
Pelecognathus Houlbert, 1915.
Eligmodontus Houlbert, 1915.
Durelius Houlbert, 1915.
Pseudodorcus Parry, 1870.
Homoderus Parry, 1862.

Scortizus Westw., 1834.
syn. *Sclerognathus* Hope & Westwood, 1845.
Sclerostomus Burm., 1847.

Aegus Macl., 1819.
syn. *Xenostomus* Boileau, 1898.
Paraegus Gahan, 1888.

Generic names treated as synonyms in 1935, *Trans. R. ent. Soc. Lond.* **83.**

Lucanus Scop., 1763.
syn. *Pseudolucanus* Hope & Westwood (subgenus), 1845.

Calcodes Westw., 1834.
syn. *Odontolabis* Hope & Westwood (subgenus), 1845.
Neolucanus Thoms., 1862.

Dorcus Macl., 1819.
syn. *Cladognathus* Burm., 1847.
Metopodontus Hope & Westwood (subgenus), 1845.
Prosopocoelus Hope & Westwood (subgenus), 1845.
Prismognathus Motsch., 1860.
Eurytrachelus Thoms., 1862.
Hemisodorcus Thoms., 1862.
Falcicornis Planet, 1894.

Aegus Macl., 1819.
syn. *Alcimus* Fairm., 1849.
Eubussia Zacher, 1913.
Malietoa Kriesche, 1921.

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Miwa, Y., 1929, *Trans. nat. Hist. Soc. Formosa* **19** : 531.
——, 1929, *Insecta Matsumurana* **3** : 74.
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Near Horizons. The story of an insect garden. By E. W. Teale. 8vo. New York (Dodd, Mead & Co.) 1943. pp. xvi + 319, 95 plates included in the pagination. Price $3.75.

This book is described as "The travel book of a man who stayed at home": his home being in the United States. It is an extremely beautiful picture book and contains some of the best pictures of insects so far published.

While the text is supplementary to the illustrations, there is much in the contents which the average reader will find of interest and the facts have been checked by accepted authorities.

Many of the illustrations will prove of value to the entomologist, perhaps more particularly some of the close-ups, but it is no exaggeration to say that all of them will give pleasure to any reader who is interested in life in the animal world or in the technique of photographing insects.

Applied Entomology. An introductory textbook of insects in their relations to man. By H. T. Fernald and H. H. Shepard. 8vo. New York and London (McGraw-Hill) 1942. 4th edition. pp. ix + 400, 383 text illust. Price $3.50.

This book is published in the series McGraw-Hill Publications in the Agricultural Sciences. The first edition appeared in 1921 and the third in 1935.

Since the last edition was published there have been many changes in the practice of controlling insect pests, more particularly in the use of insecticides. New insecticides are discussed in this book only where their use has become accepted generally and the authors give but slight reference to methods and materials of very recent development and which still need further trial to prove them practical.

Where changes in practice have become general, however, special attention is paid to them as well as to the adding of new insects of importance and of new facts about insects discussed in earlier editions.

The chapters dealing with the economic importance of insects and with methods of control have been rewritten and the chapters on Hymenoptera and Animals other than Insects have been rearranged.

Index VI to the Literature of American Economic Entomology. January 1, 1935, to December 31, 1939. Compiled by Mabel Colcord, edited by E. P. Felt and S. W. Brimley. (*Spec. Publ. Amer. Ass. econ. Ent.* **6.**) pp. [xii] + 815 (printed in double column). 8vo. College Pk., Md., 1942.

This volume is the sixth of a series begun in 1905 by N. Banks, and follows closely the pattern of the earlier volumes.

It is arranged alphabetically under the names of the insects concerned, and after each name the references to the literature are given in abbreviated form. Interpolated in the correct alphabetic sequence are such headings as Ants, Apple Insects, Bees, Bibliography, Dusts, Insecticides, and Insects. The major headings are in turn subdivided as, for example: Insects, Immature; Insects, Immigrants; Insects, Increase; Insects, Injurious and Beneficial; Insects, Instincts; Insects, Intelligence; Insects, Iowa; and so forth.

CERATOPOGONIDAE (DIPTERA) FROM EGYPT

By J. W. S. Macfie, M.A., D.Sc., M.B., Ch.B.

This collection of midges was made when I was serving with Nos. 3 and 8 Malaria Field Laboratories in Egypt. I am indebted to my colleagues Dr. W. H. R. Lumsden, the late Dr. S. H. Segerman, and Dr. O. Theodor for some of the specimens, but all the others, unless otherwise noted, were collected by me. Most of the insects were taken in the evening on windows at Moascar, near Ismailia, either in our laboratory, or in our living quarters. There, in February, midges were fairly numerous, in March and April they were abundant, but in May they again became fewer, and by the middle of that month were scarce or had entirely vanished. It was observed on several occasions that they were particularly abundant after dust storms, as if they had sought shelter in buildings from the hot, dry, dust-ladened wind. The only species which caused us annoyance by biting were *Holoconops kerteszi* and some of the species of *Culicoides*.

The collection consists of 416 specimens referable to 23 different species, five or six of which appear to be new. They include species of *Holoconops* (1), *Forcipomyia* (4), *Dasyhelea* (7), *Culicoides* (10), and *Alluaudomyia* (1). It is remarkable that these are the only genera represented. More than half the collection (214 specimens) is composed of specimens belonging to the genus *Culicoides*, all to species previously recorded.

The method of description employed is the same as that I have adopted in a number of recent reports. The unit referred to is approximately 3·7 μ. The types of all new species are in the collection of the British Museum (Natural History).

I have to thank Prof. P. A. Buxton, F.R.S., for his kindness in permitting me to examine the collection in the laboratory of his department at the London School of Hygiene and Tropical Medicine.

Holoconops kerteszi (Kieff.).

Bir el Abd, 7–8.vii.1941, 16 ♀, "North lake, on forearm of collector" and "In tents in morning" (*Dr. W. H. R. Lumsden*). Moascar: ii.1942, 5 ♂, 5 ♀; iii.1942, 7 ♂, 4 ♀; and iv.1942, 1 ♂, all "on windows." Gebel Maryim, near Moascar, 7.iv.1942, 11 ♀, "Biting" (*Dr. O. Theodor*). Ismailia, near U.S. Club, 9.iv.1942, 1 ♀.

In these specimens, which I take to be the Egyptian species *H. kerteszi*, the metatarsi of the fore legs are armed with a basal and an apical pair of spines, and with one or two spines between them which are usually unpaired. According to Kieffer's key (1921) and to that given by Goetghebuer *in* Lindner 1934, *Die Fliegen der Palaeartischen Region*, they should therefore be identified as *H. mediterraneus* K., a species found in Algeria, rather than as *H. kerteszi*, in which species it is stated there are five pairs of spines on the metatarsi of the fore legs. Carter (1921), however, found that the metatarsi of the fore legs of *H. kerteszi* bear "a basal and apical pair of slender, pointed spines, and a few (one to four) central, usually unpaired, spines"; and as the number of spines is certainly variable, and because Carter considered that "the exact arrangement of the metatarsal spines is not of specific importance," it may be doubted if *H. mediterraneus* and *H. kerteszi* are really specifically distinct.

In the female specimens from Bir el Abd and Moascar segments 4–12 of the antenna range from about 6 by 7 to 8 by 7 units, 13 about 23 by 8 (max.) units, and sensory hairs about same length as segments, decidedly thicker than longer whorl hairs and about half their length; femora and tibiae dark or darkish brown, tarsal segments paler; spines of both combs at distal end of hind tibia yellowish; hairs on femora and tibiae sparse and short; 5th tarsal segment longer than 4th; lamellae one-fifth to one-sixth length of wing; all claws equal and simple; and the two well-developed spermathecae oval, subequal, measuring in one specimen about 49 μ by 31 μ (max.), with the duct narrow and hardly at all chitinised at its commencement.

Male blackish, in many respects quite unlike the insect described by Weiss (1912) as the male of *Mycterotypus laurae*, which Carter (1921) considered to be the same as *H. kerteszi*, but closely resembling yet not identical with the male described by Freeborn and Zimmerman (1934) from specimens taken in California. *Head* blackish. Eyes bare, widely

Fig. 1.—*Holoconops kerteszi* (Kieff.). Hypopygium of male in ventral view to show general form in unflattened specimen.

separated above. Palpi blackish, third segment not swollen, about same length as terminal segment, with a very small pit. Antennae blackish, with large plume: segments 4–13 ranging from about 7 by 10 to 11 by 7 (max.) units, each bearing a whorl of hairs; 14 and 15 more elongate, their lengths about 16 and 46 units respectively, each with a small sub-basal whorl of hairs, and 15 somewhat dilated towards its end, club-shaped. *Thorax* and scutellum almost black, shining, with sparse, short, black hairs. *Wings* colourless, opalescent, length about 1·4 mm., tip bluntly rounded. Bristles along costa quite small. Microtrichia minute, no macrotrichia. Halteres with whitish knobs. *Legs* with basal segments, femora, and tibiae very dark brown; tarsal segments paler brown. Metatarsi of fore legs armed with a basal and an apical pair of spines, and with one or two unpaired spines between them. Claws on hind legs equal and simple; those on four anterior legs equal but dissimilar, the one simple, the other with a long, delicate basal barb. *Abdomen* blackish, but not as dark as thorax, with sparse, short hairs. Hypopygium (fig. 1) blackish, differing notably from the rather incomplete figure given by Kieffer (1923) of the terminalia of *H. mediterraneus*, a fact which may indicate that *H. mediterraneus* and *H. kerteszi* are not the same. It is, however, very similar to the

hypopygium of Californian examples of *H. kerteszi* (see Freeborn and Zimmerman) but differs in some details, for example in the form of the clasper. Ninth segment much reduced: tergite almost hairless, with a long rectangular extension posteriorly which ends in two short processes, the tips of which are bent ventrally. Side-pieces narrow, sparsely clothed with stout blackish bristles, concave towards middle line, with a lobe projecting on inner side near base. Claspers short, expanded at base but without the hump shown by the Californian specimens, bearing a few hairs; tips armed with a single almost spine-like process and a small knob which bears a short hair. Median sclerite very dense and dark, somewhat H-shaped (especially if flattened), with the posterior limbs expanded into highly chitinised processes of an irregular shape.

Forcipomyia biannulata I. & M.

Moascar: 15–19.ii.1942, 1 ♂, "on window."

Forcipomyia ingrami Cart.

Moascar: ii.1942, 3 ♂, 2 ♀; iii.1942, 3 ♂, 6 ♀; iv.1942, 1 ♀; and iv.1942, 1 ♀ (*Dr. S. H. Segerman*); all "on windows."

Forcipomyia sp.

Moascar: 15–19.ii.1942, 1 ♀, "on window."

This insect, which is damaged, lacking antennae, bears a single, small, pale spot on the wings, and resembles *F. biannulata* or *F. castanea*. Length of wing about 1·5 mm. Hind legs with dark brown bands on femora and tibiae, the former covering distal half or more of segment and including the joint, the latter darker and occupying middle third of segment. First tarsal segment also infuscated. No scales, and no hastate spines. T.R. about 0·9.

Forcipomyia moascari sp. n.

A rather dark brown species without scales, with the scutellum only slightly paler than the thorax, with unadorned wings and legs, and the T.R. about 2·2.

Male and female. Length of wing about 1·2 to 1·5 mm.; greatest breadth about 0·4 to 0·5 mm. As usual wings of male longer and narrower than those of female.

Head very dark brown. Palpi brown, in male longer and darker than in female: third segment about equal in length to fourth and fifth together, inflated at base (especially in female), with deep pit. Antennae dark brown. In male plume blackish: segments 4–11 successively narrower, ranging in one specimen from 13 by 12 to 12 by 9 units; 12–14 elongate, their lengths 41, 23, and 16 units respectively; 15 about 19 units, ending in a small nipple-like process. In female segments 4–10 slightly narrowed anteriorly, ranging from about 9 by 8 to 9 by 7 units, with pale, pointed, curved spines about same length as segments; 11–15 sub-equal, only slightly longer than 10, about 12 by 6 units, the last ending in a small nipple-like process. The combined lengths of segments 3–10, 4–10, and 11–15 about 75, 62, and 60 units respectively.

Thorax in dried specimens almost uniformly dark brown with a brownish pruinescence or with yellowish shoulder areas, in mounted specimens showing clearly the usual antero-posterior darker bands on dorsum. Scutellum dull, yellowish, only slightly paler than dorsum, but usually darker brown in middle (especially in males); bearing numerous bristles and hairs.

Wings unadorned, well clothed with macrotrichia (especially in females); without scales. Venation normal. Costa not reaching to middle of wing in either sex. First radial cell obliterated; second well formed, small. Halteres with whitish knobs.

Legs rather pale brown, unadorned, with only joints somewhat infuscated; bearing no scales, and no modified bristles. Form of segments, claws, and empodium normal in both sexes. T.R. about 2·2–2·3.

Abdomen dark brown. Spermatheca single, very highly chitinised, sub-spherical, diameter about 41–45 μ; duct arising obliquely and rather long and wide, about 33 μ by 14 μ. Hypopygium (fig. 2) very dark. Ninth segment in general form similar to that of *F. ingrami*; sternite not excavated in middle line posteriorly, membrane joining it to aedeagus not spiculate. Side-pieces long and narrow; claspers slender, especially towards tips. Harpes somewhat similar to those of *F. corsoni*, short, flat, rods which are straight and rather feebly chitinised at their distal ends, appearing in ventral view as shown in the figure. Aedeagus complicated, its chitinised parts almost black, in ventral view appearing somewhat as shown in the figure. It should, however, be explained that the two lateral sclerites shown at the posterior end are really curved rods directed dorsally, the appearance shown being due to foreshortening.

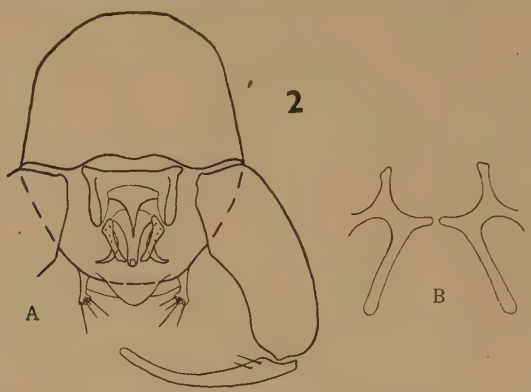

Fig. 2.—*Forcipomyia moascari* sp. n.: ventral view of hypopygium of male. (A) ninth segment and aedeagus: (B) harpes.

Moascar: ii.1942, 6 ♂, 4 ♀; iii.1942, 6 ♂, 16 ♀; iv.1942, 2 ♂, 1 ♀; and iii.1942, 1 ♂ (*Dr. S. H. Segerman*); all "on windows."

This species resembles *F. corsoni* in several respects, notably in the form of the harpes. It is, however, a larger species, and differs in the characters of the aedeagus as well as in other details.

Dasyhelea spp.

The following key may assist in the recognition of the 7 species of *Dasyhelea* found in the collection.

1. Antennae with stylet . . . . . 2.
   Antennae without stylet . . . . . 3.
2. Ninth sternite of ♂ not notched posteriorly . . . . . *fusca* C., I. & M.
   Ninth sternite of ♂ notched in middle line posteriorly . . *nyasae* I. & M.
3. Second radial cell longer than broad. No bare areas along veins of wing. Spermatheca sub-spherical, large, diameter about 100 μ. Ninth sternite with conical posterior extension ending in two everted processes *moascari* sp. n.
   Second radial cell about square . . . . . 4.
4. Females . . . . . 5.
   Males . . . . . 8.
5. Bare areas along veins of wings not wide, rather indistinct. Length of wing 1·1 mm. Legs almost uniformly brownish. T.R. about 2·3 *ismailiae* sp. n.
   Bare areas on wings distinct . . . . . 6.

6. Small species, length of wing about 0·75 mm. T.R. 2·2–2·4
inconspicuosa var. *heliophila* var. n.
Larger species, length of wing 0·9–1·1 mm. T.R. 2·5–2·7 . . . . . 7.
7. Almost black species. Scutellum almost black. Wings densely clothed with macrotrichia . . . . . *inconspicuosa* var. *arenivaga* var. n.
Dark brown species. Scutellum yellowish in part at least. Wings less densely clothed with macrotrichia . . . *inconspicuosa* var. *egypti* var. n.
8. Ninth tergite with long processes at posterior angles of unusual shape. Harpes with unpaired processes arising from right side . . *ismailiae* sp. n.
Ninth tergite with shorter processes of usual shape. Harpes with unpaired process arising from left side . . . . . 9.
9. Small species, length of wing about 0·75 mm. End of unpaired process of harpes long, slender, projecting beyond aedeagus. Aedeagus short, less than half length of side pieces . . *inconspicuosa* var. *heliophila* var. n.
Larger species, length of wing 0·9–1·1 mm. Unpaired process of harpes short, blunt, scarcely projecting beyond aedeagus. Aedeagus longer, half length of side pieces . . . . . 10.
10. Black species. Macrotrichia numerous in anal cell
inconspicuosa var. *arenivaga* var. n.
Dark brown species. Only very few macrotrichia in anal cell
inconspicuosa var. *egypti* var. n.

Dasyhelea fusca C., I. & M.

Moascar: 1–6.iii.1942, 2 ♀; iv.1942, 6 ♂, 3 ♀; all "on windows."

These specimens differ slightly from those from West Africa described by Carter, Ingram, and Macfie (1921): for example, the claspers of the male are very dark brown in colour, and the pyriform spermatheca of the female is very highly chitinised. They are larger, too, and the scutellum, shoulder areas, and abdominal markings are buff coloured rather than yellowish. Length of wing about 1·3–1·5 mm. Scutellum bearing 2 lateral bristles and a group of 14–16 bristles and hairs between them. Wings with second radial cell slightly, but in the male not very clearly, longer than broad. Macrotrichia numerous, distributed over the greater part of the wing, including the anal cell in both sexes, but leaving bare areas along the veins. Legs almost uniformly pale brown, with only joints darker. T.R. in both sexes about 2·7. Abdomen with sides and posterior margins of tergites buff.

I refer these insects to *D. fusca*, a species taken originally in West Africa, chiefly because of the characters of the hypopygium which do not appear to differ from those of that species.

Dasyhelea nyasae I. & M.

Moascar: 15–19.ii.1942, 1 ♂, "on window."

The identity of this insect is uncertain, and must remain in doubt until further specimens are available for examination. The hypopygium resembles that of *D. nyasae*, but the legs are not clearly banded.

Dasyhelea inconspicuosa C., I. & M. var. **egypti** var. n.

Moascar: ii.1942, 6 ♂, 7 ♀; iii.1942, 17 ♂, 24 ♀; iv.1942, 3 ♀; and v.1942, 1 ♂, 2 ♀; all "on windows."

All these insects are, I think, *D. inconspicuosa*, but owing to war conditions I have not been able to compare them with specimens taken in West Africa. They agree in almost every detail with the description of this species given by Carter, Ingram, and Macfie (1921), but are rather larger, length of wing about

0·9–1·1 mm. The hypopygium of the males is similar and probably indistinguishable. They vary considerably. They range in colour from dark brown to almost black, but in all of them there is some trace at least either in the scutellum, thorax, or abdomen, of the yellowish colour which is a characteristic of the species and is a prominent feature of the majority of the specimens. In some of them the scutellum is entirely yellowish or yellowish-brown, in some it is yellowish in the middle but darker at the sides, and in others, especially in males, the whole scutellum is infuscated. The scutellum often bears one or two bristles in addition to the usual 2 lateral and 4 centro-marginal bristles, 2 lateral and 5 centro-marginal being the most common, and it sometimes bears also a few (one to four) small hairs. One female with 2 lateral and 6 centro-marginal bristles and 4 small hairs which was especially examined did not seem to differ in any respect from insects with the more usual armature. The amount of yellow colour visible on the thorax also varies considerably; and the knobs of the halteres, usually white or cream-coloured, may in some individuals be brown.

The wings are well clothed with macrotrichia which, in the female, cover almost the whole surface with the exception of the radial areas, and are numerous both in the anal cell and between the branches of Cu, but leave well-defined bare areas along the veins. In the male, the macrotrichia are more scanty: in the anal cell there are only a very few and these are all, or nearly all, arranged along the anal vein, and between the branches of Cu there are also only a very few, usually only about half a dozen.

The legs are usually almost uniformly rather pale brown. In the darker individuals, however, the femora and tibiae are distinctly darker than the proximal segments of the tarsi, but they are never very dark or blackish. The knees are always dark. The T.R. is about 2·5–2·7, rather less in the male than in the female.

The hypopygium of the male agrees with the description given by Carter, Ingram, and Macfie. It differs from that of the single male taken at Nifisha and referred to later. The finger-like processes on the ninth tergite are well developed but not very long. The aedeagus is about as long as it is broad at its base (11 : 12 units), about half the length of the side-pieces. The unpaired process of the harpes, which arises from the left side, is short, and hardly projects at all beyond the end of the aedeagus. For this reason it is not easily seen, the aedeagus obscuring a good view of it. It ends rather bluntly.

D. arenosa, a species taken at Cairo and described by Kieffer (1925), may be the same as this insect, but the description given is insufficient to enable it to be distinguished from a number of allied species found in Egypt and neighbouring countries.

Dasyhelea inconspicuosa var. **heliophila** var. n.

Nifisha, near Ismailia, 4.vii.1941, 1 ♂, 2 ♀, and one inter-sex form. Found floating on the surface of a small pool of highly mineralised water in a sandy waste, exposed to the full glare of the sunshine, without any shade at all.

These specimens agree well with the description given by Carter, Ingram, and Macfie (1921) of West African examples of *D. inconspicuosa*. They are very small insects, length of wing only about 0·75 mm., and the scutellum bears only 2 lateral and 4 (5 in male) centro-marginal bristles, and no small hairs. The wings (female) bear numerous macrotrichia which cover the greater part of the surface excepting the radial areas, and are numerous in the anal cell and between the branches of Cu. The bare areas along the

veins are distinct. The T.R. is about 2·2–2·4, that is less than in the preceding species. The single spermatheca is well chitinised, oval, about 40 μ by 30 μ, and the duct, which arises a little obliquely, is chitinised for only a short distance, about 3–4 μ, at its commencement. The hypopygium of the male is similar to that of West African specimens, but the following apparent differences may be noted. In the single male available for examination no finger-like processes are visible on the ninth tergite, the aedeagus is shorter, its length less than its basal width (9 : 12), less than half the length of the side-pieces (9 : 25), and the unpaired process of the harpes ends in a long slender point which extends posteriorly some distance beyond the aedeagus.

Dasyhelea inconspicuosa var. **arenivaga** var. n.

An almost black species closely resembling *D. inconspicuosa* var. *egypti* but with the wings more densely clothed with macrotrichia, and the femora and tibiae very dark brown.

Male and female. Length of wing about 0·97–1·1 mm., greatest breadth about 0·35–0·4 mm.

Head almost black. Eyes densely hairy. Palpi very dark; third segment without pit. Antennae blackish. In male, plume blackish: segments 4–11 in one specimen ranging from 9 by 11 to 11 by 7 units; 12–14 binodose, their lengths about 23, 25, and 22 units respectively; 15 about 22 by 7 (max.) units, tapering to a blunt end, without stylet. In female, segments 4–14 forming an almost continuous series; segments 4–10 in one specimen ranging from 8 by 7 to 10 by 6 (max.) units, only slightly narrowed anteriorly, bearing curved, pointed spines which are colourless and about the same length as the segments; 11–15 only slightly more elongate, 11–14 sub-equal, about 11 by 5 (max.) units, 15 slightly longer, about 16 units, and ending in a blunt process, but without stylet. The combined lengths of segments 3–10, 4–10, and 11–15 about 73, 63, and 62 units respectively.

Thorax almost black. Scutellum almost black; bearing apparently only 2 lateral and 4–5 centro-marginal bristles.

Wings with veins enclosing radial cell infuscated so as to form a dark spot about middle of anterior border. Macrotrichia numerous, more dense than in *D. inconspicuosa* var. *egypti*, covering nearly whole surface excepting radial areas. Bare areas along veins distinct, but narrow. Costa extending nearly half length of wing. First radial cell obsolete; second quite small, almost square. Fork of Cu slightly proximal in female, slightly distal in male, to level of end of costa. Halteres with blackish stems, and knobs which contain a yellowish substance and are whitish in females, deeply infuscated or dark brown in males.

Legs with femora and tibiae very dark brown or blackish, much darker than proximal segments of tarsi. T.R. about 2·1 in male, 2·5 in female. Form of segments and claws normal.

Abdomen almost black. Spermatheca single, highly chitinised, sub-spherical, diameter apparently about 41 μ. Hypopygium similar to that of *D. inconspicuosa* var. *egypti* and perhaps indistinguishable from it. It is, however, blacker and more highly chitinised, and the finger-like processes of the ninth tergite appear to be slightly longer.

Moascar: ii.1942, 1 ♀; iii.1942, 3 ♂, 1 ♀; all "on windows."

In the dried condition these insects appear to be entirely black, but in their morphology they resemble *D. inconspicuosa* in almost every detail. The thorax and scutellum are both almost black, without any yellowish adornment. The legs are not almost uniformly brown, as in *D. inconspicuosa*, but have the femora and tibiae dark or very dark brown, much darker than the proximal segments of the tarsi. The only clear morphological difference I have detected is in the wings. The wings are more hairy, the macrotrichia

more dense, and covering a greater part of the membrane. This is especially apparent in the males, for in them macrotrichia are abundant in the anal cell and between the branches of Cu, whereas in the specimens which I have referred to as *D. inconspicuosa* var. *egypti* there are only a very few macrotrichia in the anal cell and they are all, or nearly all, distributed along the anal vein, and between the branches of Cu there are also only a very few macrotrichia, fewer than a dozen. The hairiness of the wings of these males is indeed about as great as that of the females of *D. inconspicuosa* var. *egypti*.

So far as can be judged without actually comparing specimens, these insects resemble closely those from the Marquesas and Society Islands for which I proposed (1933) the name *D. pacifica*.

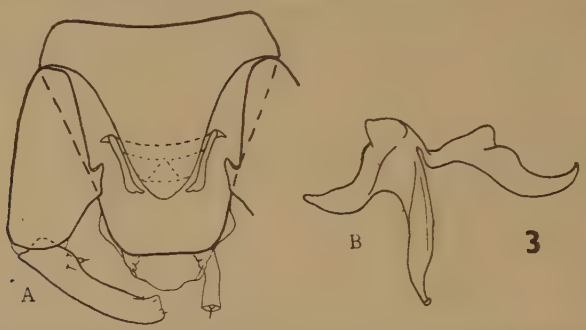

Fig. 3.—*Dasyhelea ismailiae* sp. n.: ventral views of hypopygium of male. (A) ninth segment and aedeagus: (B) harpes.

Dasyhelea ismailiae sp. n.

An almost black species with the scutellum yellowish, the legs almost uniformly pale to darkish brown, and the wings with only narrow or rather indistinct bare areas along the veins.

Male. Length of wing about 1·1 mm., greatest breadth about 0·34 mm.

Head almost black. Eyes densely hairy. Palpi brown, long and slender, third segment sub-cylindrical, without pit. Antennae blackish: segments 4–11 gradually narrowing from about 9 by 10 to 10 by 7 units; 12–15 elongate, lengths about 20, 25, 18, and 18 units respectively, 12–14 binodose, 15 without stylet.

Thorax almost black with greyish pruinescence, anterior angles with small yellowish patches. Scutellum yellowish with sides slightly darker; bearing two lateral and 4–5 centro-marginal bristles, and one or two small hairs.

Wings unadorned, radial veins only slightly brownish. Macrotrichia abundant, covering almost whole wing excepting radial areas but leaving rather narrow bare areas along veins, numerous in anal cell and between branches of Cu. Costa extending about half length of wing. Second radial cell of usual form, small, almost square. Fork of Cu well distal to level of end of costa. Halteres with whitish knobs.

Legs almost uniformly rather pale to darkish brown, with knees dark. Form of segments and claws normal. T.R. about 2·3.

Abdomen blackish. Hypopygium of male (fig. 3) very dark, in general form similar to that of *D. dehalperti* or the Hawaiian species *D. hawaiensis*. Ninth sternite without bristles, prolonged posteriorly in middle line as conical process. Ninth tergite with strong but rather scanty bristles, bearing at posterior angles a long process dimpled at its end and armed with a stout bristle (cf. *D. hawaiensis*). In the figure this process is shown on one side only. Side-pieces without lobe-like projections. Claspers very dark at base, with broad blunt ends; bearing on inner side near base three small bristles, one of which

is mounted on a short process. Harpes very asymmetrical and folded variously, in one specimen appearing in ventral view as shown in the figure; general form similar to those of *D. dehalperti*, that is consisting of an irregular transverse strip of chitin attenuated in middle with a long unpaired process arising from it on the right side which tapers distally and is bent ventrally at its tip. Chitinised part of aedeagus as shown in figure.

Moascar: 22–26.ii.1942, 3 ♂; 1–6.iii.1942, 2 ♂; all "on windows."

Female. One damaged female, taken at the same time and place as three of the males, may be the female of this species. It is a dark brown insect, not so dark as the males, but of about the same size. Length of wing about 1·1 mm., greatest breadth about 0·44 mm. Its chief characters are as follows. *Head* blackish. Antennae mostly missing, but basal segments very dark brown, much as in *D. inconspicuosa*. *Thorax* very dark brown, not blackish as in males, with larger yellowish areas at shoulders and above wings. Scutellum yellowish-brown, bearing 2 lateral and 5 centro-marginal bristles, and one or two small hairs. *Wings* unadorned but with veins enclosing second radial cell infuscated and thus forming a darkish patch. Macrotrichia abundant, covering whole wing excepting radial areas, and numerous in anal cell and between branches of Cu; bare areas along veins hardly recognisable, not wide and distinct as in *D. inconspicuosa*. Costa extending fully half length of wing. Second radial cell nearly square, slightly longer than broad, as in *D. inconspicuosa*. Fork of Cu at about same level as middle of second radial cell. Halteres with whitish knobs. *Legs* almost uniformly brownish, more yellowish-brown than in males, with dark knee spots. T.R. about 2·3. *Abdomen* dark brown, with posterior extremity more yellowish. Spermatheca single, highly chitinised, sub-spherical, diameter about 45 μ; the duct arising obliquely, and chitinised for only a short distance.

This insect, in fact, lacks distinctive characters. It differs little from the female *D. inconspicuosa* excepting in the greater hairiness of the wings.

Moascar: 22–26.ii.1942, 1 ♀, "on window."

Dasyhelea moascari sp. n.

A very dark brown species with a yellowish-brown scutellum, dark brown femora and tibiae, the wings well clothed with macrotrichia which do not leave bare areas along the veins, and the second radial cell longer than broad.

Male and female. Length of wing 1·4–1·6 mm.; greatest breadth, 0·45–0·5 mm. As usual wings of male longer and narrower than those of female.

Head almost black. Eyes densely hairy. Palpi dark brown; third segment without pit. Antennae very dark. In male, plume large, blackish: segments 4–11 gradually narrowing from about 11 by 13 to 13 by 8 units; 12–15 elongate, their lengths about 38, 35, 25, and 25 units respectively, 12–14 binodose, 15 ending in a conical process but without stylet. In female, segments 4–10 ranging from about 9 by 8 to 10 by 6–7 units, only slightly narrowed at apices; segments 11–14 more elongate, sub-equal, about 15 by 6 units; 15 slightly longer, about 18 by 7 (max.) units, tapering distally, ending in a short, blunt process.

Thorax almost black. Scutellum dull yellowish-brown; bearing a transverse row of about 11 bristles, and a few (4) smaller hairs.

Wings unadorned, but in females radial cell infuscated and so forming a dark patch about middle of anterior border. Macrotrichia numerous, covering almost whole surface and not leaving bare areas along veins. In male, as in female, numerous in anal cell, and between M and Cu extending almost to base. Costa extending slightly beyond middle of wing. First radial cell obliterated; second well formed, longer than broad. Fork of Cu at about same level as middle of second radial cell. Halteres with whitish knobs which, however, are marked with a dark brown patch.

Legs with all femora and tibiae darkish brown; tarsi with last 2–3 segments and all joints infuscated. Form of segments and claws normal. T.R. about 2·0–2·2.

Abdomen very dark brown. Spermatheca single, well chitinised, sub-spherical, large, diameter about 100 μ; the chitinised portion of duct long, about 40 μ, tapering, arising obliquely. Hypopygium (fig. 4) very dark. Ninth sternite without bristles, with median posterior extension ending in a pair of everted processes with a notch between them. Ninth tergite with numerous strong bristles; lateral processes on posterior margin small. Side-pieces with rounded process on inner side at base. Claspers blackish, but paler at ends, with rather sharp, infuscated tips. Harpes as shown in figure: unpaired process long, slender, finely pointed at extremity. Chitinised portions of aedeagus appearing in ventral view as two lateral rods with pointed ends which are joined at base by a transverse bar.

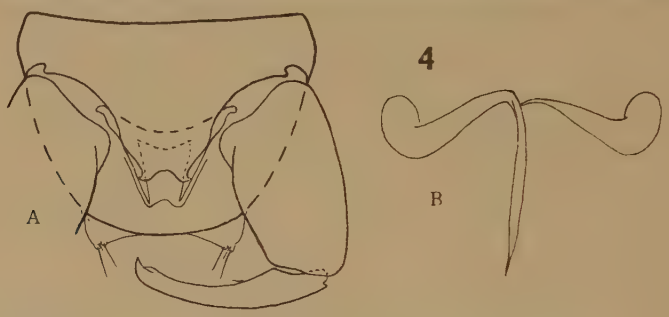

Fig. 4.—*Dasyhelea moascari* sp. n.: ventral view of hypopygium of male. (A) ninth segment and aedeagus: (B) harpes.

Moascar: ii.1942, 3 ♂, 2 ♀; iii.1942, 1 ♂, 2 ♀; and iv.1942, 1 ♀; all "on windows."

Culicoides circumscriptus Kieff.

Moascar: 7–14.iii.1942, 1 ♂, "on windows"; 15–31.iii.1942, 1 ♂, 4 ♀, "on windows"; iii.1942, 1 ♂, "in bungalow" (*Dr. O. Theodor*); iv.1942, 1 ♂, "on window"; iv.1942, 12 ♂, 2 ♀, "in bungalow" (*Dr. O. Theodor*); iv.1942, 26 ♂, 7 ♀, "on windows in bungalow" (*Dr. S. H. Segerman*); v.1942, 1 ♀, "on window."

Culicoides egypti Macfie.

Moascar: 15–19.ii.1942, 1 ♂, 1 ♀, "on windows"; 15–31.iii.1942, 1 ♂, "on window"; iii.1942, 3 ♂, "in bungalow" (*Dr. O. Theodor*); iii.1942, 1 ♀, "on window" (*Dr. S. H. Segerman*); iv.1942, 1 ♂, "on window"; iv.1942, 3 ♀, "on windows" (*Dr. S. H. Segerman*); and iv.1942, 3 ♀, "in bungalow" (*Dr. O. Theodor*).

These insects are the same as the single female taken at Assiut and described by me (1924) under the name *C. distinctipennis* Aust. var. *egypti*. The adornment of the wings, although similar to that of *C. distinctipennis*, differs in having the pale spot immediately distal to the end of the costa divided, as it is in *C. praetermissus*. The single spermatheca is shaped like a peg-top, as it is in *C. distinctipennis*. The hypopygium of the male is, however, unlike that of *C. distinctipennis* but resembles closely that of *C. praetermissus*. Ninth segment with sternite rather deeply excavated, the membrane joining it to aedeagus spiculate only at base. Harpes stout and highly chitinised, tapering distally and curved ventrally, with rather blunt ends. Aedeagus V-shaped, with ventral wall prolonged anteriorly for some distance, as in *C. praetermissus*.

It is probable that *C. pharao*, an Egyptian species described by Kieffer

(1925), is the same as *C. egypti*, but unless the types are still available for further examination it will not be possible to be certain of this synonymy because Kieffer does not describe either the spermatheca or the characters of those parts of the hypopygium of his species which are of greatest specific importance.

Culicoides kingi Austen.

Moascar: ii.1942, 1 ♀; iii.1942, 1 ♂, 3 ♀; and iv.1942, 1 ♀; all "on windows."

As pointed out by Austen, this species resembles *C. schultzei* very closely. The difference most easily appreciated is that found in the arrangement of the pale areas in the region of the fork of Cu. Here, between the branches of Cu, there are two pale areas in *C. kingi*, a rounded spot near the posterior margin of the wing, and an elongated or teardrop-shaped spot anterior to it and lying up against Cu 1, whereas in a typical specimen of *C. schultzei* there is only a single pale spot between the branches of Cu, and that is elongated or somewhat reniform in shape. *C. schultzei* is well known to be a variable species, and *C. kingi* should probably be regarded as only a variety of it. The hypopygium of the male is apparently indistinguishable from that of *C. schultzei*.

Culicoides sp.? *langeroni* Kieff.

Bir el Abd, 7.vii.1941, 2 ♀, "In tents in morning" (*Dr. W. H. R. Lumsden*).

These insects, which have no very characteristic features, cannot be identified definitely until males are available for examination. They may, however, be the same as *C. langeroni*, a species found in Tunisia and described by Kieffer (1921), or *C. arenarius*, a species found in British Somaliland and described by Edwards (1922), which may be the same as *C. langeroni*.

They are small, pale yellowish-brown insects with unadorned thorax and wings. Length of wing about 1 mm. Palpi pale, brownish, third segment greatly inflated, with a large shallow pit in anterior half; lengths of last three segments about 14, 5, and 8 units respectively. Antennae pale brown, segments 4–10 oval, in one specimen measuring from 7 by 6 to 8 by 5 units; 11–14 vasiform, sub-equal, about 10 by 7 (max.) units; 15 longer, about 20 by 6 (max.) units, tapering distally, without stylet. The combined lengths of segments 11–15, 4–10, and 3–10 in one specimen 65, 52, and 65 units respectively. Thorax yellowish-brown, unadorned, with sparse and rather dark brown hairs. Wings unadorned, venation and distribution of macrotrichia much as in *C. inornatipennis*. Legs pale, brownish; T.R. about 2. Abdomen pale, brownish; spermathecae 2, well chitinised, oval, sub-equal, about 41 μ by 26 μ, the duct chitinised for a short distance, about 11 μ, at its commencement.

A brief reference may be made here to another specimen, a single female taken by Dr. W. H. R. Lumsden at Jiarabûb in Libya on 17th August, 1941, which also cannot be identified until males are available for examination. It bears a general resemblance to the specimens from Bir el Abd but is larger, length of wing about 1·2 mm., and although light brown in colour it is somewhat darker, more amber-brown. Other points that may or may not be characteristic are that the palpal pit is deeper, and that the terminal segments of the antenna are slightly longer. Dr. Lumsden noted that this species was "troublesome in early morning, 05.30–06.00 hrs., in redoubt."

Culicoides pallidipennis C., I. & M.

Moascar: 15–19.ii.1942, 1 ♀, "on window"; 1–6.iii.1942, 1 ♂, "on window"; 7–14.iii.1942, 1 ♀, "on window"; 15–31.iii.1942, 1 ♂, 3 ♀, "on

window"; iii.1942, 2 ♂, 1 ♀, "in bungalow" (*Dr. O. Theodor*); iv.1942, 4 ♂, 14 ♀, "on windows"; iv.1942, 2 ♀, "on windows" (*Dr. S. H. Segerman*); and v.1942, 1 ♂, "on window." Also Sarafand, Palestine, ix.1941, 1 ♀.

These specimens agree well with West African examples, but are more clearly marked, their wings being indeed often conspicuously adorned. The hypopygium of the males has one peculiarity, the ventral wall of the aedeagus is chitinised and brownish in colour almost to its basal quarter. In all other respects the parts of the hypopygium are as shown in the figures given by Carter, Ingram, and Macfie (1920). The species resembles rather closely *C. obsoletus* Mg. but is smaller, length of wing 1·2 mm. or less. The hypopygium, however, is very different (see Edwards, 1939), and resembles more nearly that of *C. chiopterus* Mg.

Culicoides pulicaris (L.).

Bir el Abd, 7–8.vii.1942, 1 ♂, 10 ♀, "In tents in morning" (*Dr. W. H. R. Lumsden*), and 3.v.1942, 1 ♀, "biting" (*Dr. C. Wollaston*). Moascar, 15–31.iii.1942, 1 ♀, "on window."

Most of these specimens would probably have been identified by Edwards (1939) as *C. halophilus* K. both on account of the markings on the wings and because of the characters of the hypopygium, but others resemble more closely rather pale forms of the *punctatus* Mg. variety of *C. pulicaris*. *C. pulicaris* is a very variable species, and for this reason I have preferred to refer them all to this species. They are presumably the same as *C. newsteadi* Aust.

Culicoides puncticollis Becker.

Spinney Wood, Ismailia, 24.vii.1941, 15 ♂, 9 ♀. Reared from larvae found in a small collection of brown, discoloured water at the bottom of a shallow "slit trench" dug in the sand. With them were numerous larvae of *Anopheles multicolor*. When the midges emerged they did so in the evening, at about 6 p.m. Also, Moascar, iii.1942, 1 ♀, "on window" (*Dr. S. H. Segerman*), and Nifisha, near Ismailia, 11.iv.1942, 2 ♀, "Biting" (*Dr. O. Theodor*).

The specimens show a considerable range of variation, some being much darker than others, but none being very dark. The spots at the bases of the hairs on the mesonotum are in most specimens conspicuous, but in others they are more or less obscured by the deeper colour of the antero-posterior bands. The latter forms are probably the same as those from Alexandria examined by Kieffer (1925) and considered by him to be a variety of *C. donatieni*. The wing markings in the majority are much less distinct than they are shown to be in Edwards' (1939) figure, and the macrotrichia are more scanty, being confined almost to the tips of the wings beyond the level of the end of the costa, and absent from, or rare in, the anal cell and the area enclosed between the branches of Cu. Length of wing 1·4–2·0 mm., in the majority well under 1·5 mm. Legs quite pale brown.

It has been suggested by Edwards (1939) that *C. riethi* and *C. puncticollis* may be merely northern and southern forms of the same species. In support of this view, and notwithstanding the great dissimilarity in size and general appearance between the specimens and examples of *C. riethi* in the collection of the British Museum which I have examined, it may be noted that in the insects from Ismailia the single spermatheca is like that figured by Edwards as characteristic of *C. riethi*, and that the hypopygium is similar. The spermatheca is oval, rather longer than the example figured by Edwards, measures

about 82 μ by 44 μ (max.), and has a wide opening towards the duct. It is only moderately well chitinised. The hypopygium is similar to that of *C. riethi* with which I have compared it. It is, however, much less highly chitinised, and in consequence the excavation in the ninth sternite is difficult to detect although it is actually present but is narrower, more like a notch, than shown in Edwards' figure which seems to have been drawn from a specimen in which it was exceptionally wide.

On the front are two small projections as noted by Kieffer in *C. donatieni*, a species which Edwards includes as one of the synonyms of *C. puncticollis*. These projections are not peculiar to this species but are found also in other allied species.

Larva of the usual *Culicoides* type, vermiform, aquatic, very active. Length 5–6 mm. Head rather feebly chitinised, yellowish. Mandibles moderately well chitinised, pointed, without any definite barb. Hypopharyngeal sclerite armed on each side posteriorly with a comb of about 10 small teeth, none of which is especially well developed, but which increase slightly in size towards the middle line. Body cylindrical, whitish, with sparse and quite inconspicuous hairs.

Pupa with cephalo-thorax dark brown, darker than abdomen. Length about 3 mm. Respiratory trumpets raised on rather long pedicles, length about 0·3 mm. Distal ends and often middle as well more or less darkened, the latter portion irregularly annulated. Stem with two or three knob-like projections at varying points. Main tracheal trunk terminating distally in an irregular fan-like arrangement of about 12–17 short, blunt processes. Cephalothorax with tubercles arranged similarly to those of *C. accraensis*. Last segment of abdomen with only basal quarter spiculate, its lateral processes widely divergent in both sexes, projecting almost at right angles to long axis of body, with pointed ends which are often infuscated.

Culicoides schultzei (End.).

Bir el Abd, 7.vii.1941, 1 ♂, 2 ♀, "In tents in morning" (*Dr. W. H. R. Lumsden*). Moascar: viii.1941, 2 ♀, "On windows of laboratory"; iii.1942, 2 ♂, 2 ♀, "On windows of laboratory"; iii.1942, 1 ♂, 4 ♀, "In bungalow" (*Dr. O. Theodor* and *Dr. S. H. Segerman*); iv.1942, 4 ♂, "On windows of laboratory"; iv.1942, 1 ♂, 2 ♀, "In bungalow" (*Dr. O. Theodor* and *Dr. S. H. Segerman*).

The specimens from Bir el Abd, and some of those from Moascar also, differ considerably from typical examples of *C. schultzei*. The thorax, for example, is not clearly adorned with dark spots but bears the usual antero-posterior bands which are dark brown and so obscure the spots more or less completely; and the wings bear a group of three pale spots (not two) just beyond the end of the costa, the third being a small but distinct spot situated in the distal part of the area immediately posterior to R 4 + 5 which is usually marked only by a general pallor (fig. 5). *C. schultzei*, however, is known to be a very variable species in size, in colour, and in the details of the adornment of the thorax and wings, and there is no reason to consider the specimens from Bir el Abd as especially remarkable. I have examined specimens from Malaya (*C. oxystoma* K.) which resemble them in every respect.

Culicoides similis C., I. & M.

Moascar: 22–26.ii.1942, 2 ♂, "on windows"; 1–6.iii.1942, 3 ♂, 1 ♀, "on windows": iv.1942, 1 ♂, 2 ♀, "on windows"; iv.1942, 10 ♂, 14 ♀, "in

bungalow" (*Dr. O. Theodor*); and iv.1942, 2 ♀, "on window" (*Dr. S. H. Segerman*).

The thorax in a few of these specimens is quite a light brown colour.

Culicoides vitreipennis Austen.

Bir el Abd, 7–8.vii.1941, 4 ♂, 3 ♀, "In tents in morning" (*Dr. W. H. R. Lumsden*); and 3.v.1942, 1 ♀, "biting" (*Dr. C. Wollaston*). Moascar, iv.1942, 1 ♂, "in bungalow" (*Dr. O. Theodor*).

These specimens should probably be assigned to the same species as the single female taken by Austen in his tent near Jerisheh, in Palestine, which he described (1921) and named *C. vitreipennis*. This species Edwards (1939) considered might well be the same as *C. albihalter* K., and he quotes an opinion of Goetghebuer that *C. albihalter* might be an earlier name for *C. heliophilus* Edw. All four species are clearly similar, and with them must be associated *C. inornatipennis* C., I. & M. and *C. judaeae* Macfie. Owing to war conditions

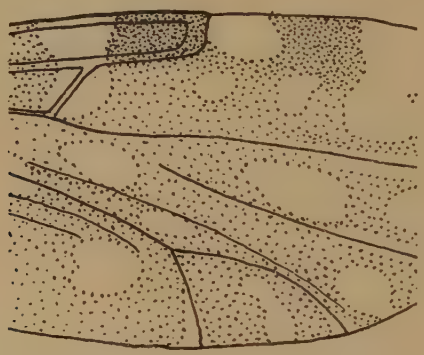

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Fig. 5.—*Culicoides schultzei* (End.): part of wing to show adornment.

I have been unable to re-examine the types of *C. judaeae* to compare them with the insects from Bir el Abd, but I believe there are definite differences, *e.g.* in size, and in the form of the aedeagus.

All but one of the specimens from Bir el Abd were preserved in spirit and are therefore not easy to compare with Austen's description of *C. vitreipennis* which is based entirely on the colour characters of the dried insect. The following details regarding them may therefore be found useful.

Head dark brown. Palpi brown, similar to those of *C. judaeae*. Antennae brown, similar to those of *C. judaeae*: combined lengths of segments 4–12 and 13–15 of male about 76 and 68 units respectively, and of segments 11–15, 4–10, and 3–10 of female about 78, 62, and 73 units respectively. *Thorax* almost uniformly darkish brown. Scutellum paler, more yellowish; bearing the usual 3 or 4 bristles and a few small hairs (about 8 to 12 in female). In *C. vitreipennis*, it should be noted, the scutellum is described as "agreeing in coloration with remainder of dorsum". *Wings* unadorned, but when viewed with a hand lens showing a small clear area just beyond the end of the costa, with a slightly infuscated area on each side of it caused partly by the distribution of the macrotrichia, and partly by infuscation of the wing membrane, but not due to any difference in the colour of the macrotrichia. The hairs on the radial cells are pale in *C. vitreipennis*, like those on the rest of the wing (Edwards 1939), whereas in *C. heliophilus* they are largely black although they do not form an obvious black spot as in *C. stigma*. Length of wing

about 1·25 mm., that is about the same as in *C. vitreipennis* or *C. heliophilus*, and longer than in *C. judaeae* or *C. inornatipennis*. Distribution of macrotrichia and venation as in *C. judaeae*. Halteres with pale knobs. *Legs* brown, much as in *C. judaeae*. T.R. 2 or slightly less; tarsal segment 5 slightly longer than 4. *Abdomen* brown, paler than thorax. Spermathecae 2, well chitinised, oval rather than sub-spherical, unequal, the duct not at all chitinised. Hypopygium darker brown than rest of abdomen, much as in *C. heliophilus*. Ninth tergite cleft, with posterior processes longer than those of *C. judaeae*, about the same length as those of *C. heliophilus*, but not so long as in *C. inornatipennis*. Ninth sternite widely but not very deeply excavated, as in either *C. judaeae* or *C. heliophilus*. Ventral root of side-piece (coxite) inconspicuous, not foot-shaped. Harpes much as in *C. judaeae*, but tips sometimes curved as in *C. heliophilus*. Aedeagus Y-shaped, as in *C. heliophilus* (see Edwards, 1939), but with the stem portion rather narrower and longer. Membrane joining aedeagus to ninth sternite not spiculate or with only a few spicules at base.

The single specimen from Moascar, a male, agrees in most of its characters with the others but is rather larger, length of wing about 1·45 mm., and the combined lengths of segments 4–12 and 13–15 of its antennae are about equal, namely 88–89 units. The hypopygium apparently does not differ in any important respect from that of the males from Bir el Abd excepting in having more numerous spicules on the membrane joining the aedeagus to the ninth sternite.

Alluaudomyia melanosticta (I. & M.).

Moascar, 1–6.iii.1942, 1 ♂, and 7–14.iii.1942, 1 ♀, " On windows of laboratory in evening."

The male agrees well with the description of the original, Gold Coast, specimen, and has a similar and apparently indistinguishable hypopygium. As I have noted elsewhere (1924), the wings of the female are adorned with more numerous black or blackish markings than those of the male. The smaller markings are probably somewhat variable. In both the specimens from Moascar there are two small blackish spots between the branches of Cu. It seems probable that *A. nilogenes* (K.) should be regarded as a synonym of *A. melanosticta* (I. & M.).

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Insects of Guam. I. (*Bull. Bernice P. Pishop Mus.* **172** : 1–218, 10 pls., 1 map, text illust.) 1942.

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TO BE HELD IN THE SOCIETY'S ROOMS

41, Queen's Gate, S.W.7

1943.

WEDNESDAY, November 3
„ December 1

1944.

„ January 19 (ANNUAL MEETING)
„ February 2

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Forms of application for Fellowship, copies of the Bye-Laws and the List of Fellows may be obtained from the Registrar.

Meetings and Exhibitions

Fellows and others wishing to make a communication to a General Meeting of the Society are requested to send in their names, the title of their exhibit, and a short abstract of their remarks, to the Registrar fourteen days before the meeting at which it is proposed to make the communication. Should it be desirable to publish a fuller account of the communication the manuscript may be submitted for publication in *Proceedings Series A* or *Series B*. If the epidiascope is required, 24 hours' notice must be given. Objects for projection should not exceed 6 ins. by 6 ins.

Fellows resident abroad, or otherwise unable to attend meetings, are reminded that notes or observations sent to the Secretary may be communicated to a General Meeting on their behalf.

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